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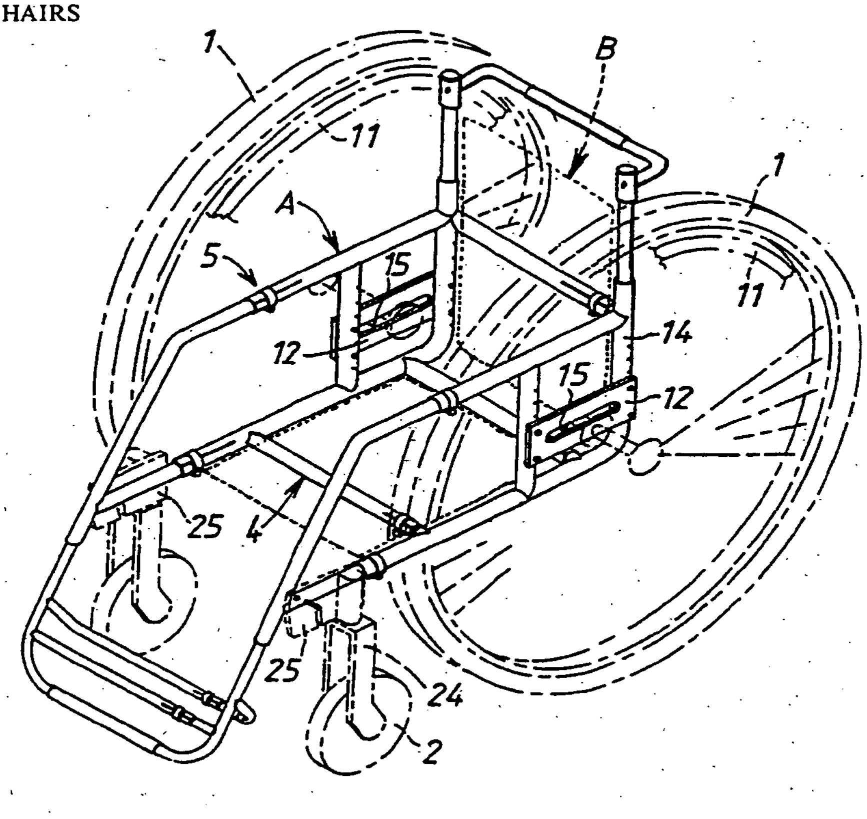
(54) Title: WHEEL CHAIRS



(57) Abstract

Wheel chair has a frame (A) made up of tubular members (4, 5) which are slidable one within the other to enable both the width and length of the frame (A) to be adjusted so that the wheel chair can accommodate different sizes of occupant.

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WHEEL CHAIRS

The present invention relates to wheel chairs.

BACKGROUND TO THE INVENTION

Wheel chairs are known which comprise a frame mounted on a pair of relatively large diameter rear wheels and a pair of relatively small diameter front wheels.

A seat assembly is carried by the frame to support the occupant and the frame would normally have a foot rest member extending downwardly and forwardly at the bottom front end of the frame to support the occupants feet.

The large diameter rear wheels are provided with hand rims by which the occupant can rotate the rear wheels in order propel the wheel chair.

The small diameter front wheels are of the castor type so that they can adapt to changes in direction of the wheel chair.

Whilst wheel chairs of the kind described above were once only produced for use by disabled persons for transport purposes, in recent years such wheel chairs have been specially designed and adapted to enable disabled persons to participate in sporting events such as basketball. For this purpose the wheel chair must be structurally strong but light and must be very manoeuvrable.

Where disabled children are concerned it is normal practice to provide the child with a sub-full-size wheel chair suitable for their smaller size compared with an adult. In fact as the child grows it may be that he/she will have to be provided in succession with several sub-full-size wheel chairs of progressively increasing size before the child is large enough to fit a full-size wheel chair. Clearly such provision of two or more sizes of wheel chair is expensive and inconvenient.

The present invention is concerned with providing a wheel chair which is robust, lightweight and manoeuvrable and which is adapted to accomodate different sizes of occupant.

SUMMARY OF THE INVENTION

According to the present invention a wheel chair comprises the following combination of features:

a) a frame made up of a plurality of transverse and longitudinal members; and

b) sufficient of said members are constructed so that their length can be varied whereby both the width and the length of the frame may be adjusted.

DESCRIPTION OF THE DRAWINGS

How the invention may be carried will now be described by way of example only and with reference to the accompanying drawings in which:

Figure 1 is a perspective view showing a wheel chair constructed according to the present invention;

Figure 2 is a side elevational view of the wheel chair shown in Figure 1;

Figure 3 is a view similar to Figure 1 but on an enlarged scale of the frame of the wheel chair shown in Figure 1;

Figure 4 is a fragmentary enlarged view of the locking mechanism used in the frame of Figure 3;

Figure 5 is a fragmentary cross-sectional view showing the quick-release mounting mechanism for the large diameter rear wheels of the wheel chair of Figure 1;

Figure 6 is an enlarged fragmentary side elevational view of the mounting arrangement for the small diameter front wheels of the wheel chair shown in Figure 1;

Figure 7 is a perspective view showing the seat assembly of the wheel chair shown in Figure 1; and

Figure 8 is a fragmentary enlarged view showing the strap and buckle arrangement forming part of the seat assembly of Figure 7.

DESCRIPTION OF THE EMBODIMENT

A wheel chair comprises a frame assembly generally indicated by A which carries two relatively large diameter rear wheels 1 and two relatively small diameter front wheels 2.

A seat assembly generally indicated by B is mounted on the frame A.

THE FRAME ASSEMBLY

The frame assembly A consists of laterally extending tubular members 4 and longitudinally extending tubular members 5, the tubular members 4 and 5 both being made of steel or aluminium alloy.

Each tubular member 4 comprises a larger diameter tube 4a and a smaller diameter 4b, the end of the latter being slidable in the former to vary the overall length of the tube. In a similar manner each of the longitudinal tubes 5 comprises a larger diameter tube 5a and a smaller diameter tube 5b so that the length of the tube can be varied.

Each of the tubes of a pair of tubes 4a, 4b and 5a, 5b is lockable with respect to the other of the tubular pair by means of the locking mechanism shown in Figure 4.

The way in which this locking mechanism operates is as follows. The larger diameter tube 4a or 5a, the latter being illustrated in Figure 4, has a slot 6 and carries a collar 7 which can be tightened or loosened by means of a so-called Allen key engageable in a socket 9 in the end of the threaded member 8.

Rotation of the threaded member 8 will either cause the diameter of the larger tube 5a to be contracted or expanded to either grip the smaller diameter tube 5b or release the smaller diameter tube 5b to enable the two tubes 5a and 5b to be slid with respect to one another in order to effect either a lengthening or a shortening of the tube as a whole.

By constructing the frame of the wheel chair in such a way that lateral and longitudinal members can be adjusted in length it is possible to adjust the overall size of the frame member, and thus in effect the overall size of the wheel chair as a whole, to accomodate different sizes of occupant.

Although the drawings illustrate a frame made up of circular section tubular members the frame could be constructed of tubular members of other cross-sections. Furthermore, it is not essential, although preferable, that the frame members should indeed be tubular. They could be of other cross-sections and forms, provided that it is possible to adjust the lengths of the members making up the frame in order to enable the overall width and/or the overall length of the frame to be alterred. Clearly, also, the strength required and the number of lateral and longitudinal members incorporated in the frame will determine the cross sections and/or forms which are suitable.

Similarly, the invention is not limited to the specific locking arrangement shown in Figure 4 since other types of locking arrangements could be employed.

THE REAR WHEEL MOUNTING

Each rear wheel 1 is provided with a hand rim 11 by which the occupant of the wheel chair can rotate the rear wheels in order to propel the wheel chair.

Each rear wheel 1 is mounted on the frame A by means of an arrangement which not only allows each wheel to be quickly disassembled from or assembled to the frame A but also enables the height of the frame A to be adjusted in relation to the ground.

To this end each wheel is carried by a plate 12 which can be secured in one of a number of vertical positions in relation to the frame A by means of bolts 13 which engage in a series of holes 14 formed in the frame.

Each plate 12 has a slot 15 in which the axle 16 of the wheel 1 is indirectly mounted, there being means to adjust the position of the axle 16 in the slot 15 in order to reduce or increase the distance between the front and rear wheels of the wheel chair.

The manner in which the axle 16 of the wheel 1 is mounted in relation to the plate 12 is shown in more detail in Figure 5, together with an indication of a quick-release mechanism by which each of the large diameter rear wheels 1 may be dismounted from or mounted on the frame A.

The axle 16 of the wheel 1 is insertable into a tube

17 which can be locked in a selected position with respect to the slot 15 by means of nuts 18.

The axle 16 incorporates a quick-release mechanism of known construction. This mechanism consists essentially of a member 19 which extends through the length of the hollow axial 16 and has at its outer end a press button 20 and at its inner end is loaded axially by a spring 21.

The inner end of the member 19 is provided with a groove 22 into which a latch member can engage to locate the member 19 and hence the axle 16 longitudinally with respect to the tube 17.

In order to release the axle 16 from the tube 17 the press button 20 is depressed against the action of the spring 21 in order to disengage the groove 22 from the latch 23. As stated earlier this quick-release mechanism is of known construction.

FRONT WHEEL MOUNTING

The relatively small diameter front wheels 2 are of the castor type. The wheel itself is mounted at the lower end of a cranked wheel arm 24 the upper end of which is rotatably mounted on a plate 25. Thus the arm 24 can rotate about a generally vertical axis to enable the wheel 2 to accommodate and follow changes in direction of the wheel chair as a whole.

The plate 25 is adjustably mounted on the frame A, the details of this mounting arrangement being shown on an enlarged scale in Figure 6.

Each plate 25 has a series of arcuately disposed holes 26 at one end, a pivot hole 27 at its other end and arcuate slot 28 between the holes 26 and 27.

The plate 25 is secured to the frame A in the following manner. A first bolt 29 engages in the hole 27 and in the frame member 5b. A second bolt 30 engages in one of the arcuately arranged holes 26 and in the frame member 5a.

By in effect pivoting the plate 25 about the bolt 29 and selecting the appropriate hole 26 of the plurality of holes 26 the angular position of the plate 25 with respect to the frame can be adjusted (see Figure 2). This would be done in order to compensate for vertical adjustment of the large diameter rear wheels 1 in relation to the frame A which would otherwise tilt the seat at an unacceptable angle.

A bolt 31 carried by the frame member 5b engages in the slot 28 to stabilise the plate 25.

The mechanism for mounting the small wheels 2, and shown in detail in Figure 6, is known.

As an alternative each front wheel could also be mounted to the frame by a quick release mechanism.

THE SEAT ASSEMBLY

The seat assembly B consists essentially of a seat portion 32 and a back portion 33 each of which is made of flexible material and provided with a plurality of straps 34 and a plurality of straps 35. Each pair of straps 34/35 carries means to enable their ends to be releasably connected in order to secure the seat portion 32 and the back portion 33 to the frame A of the wheel chair.

More specifically the straps 34 are provided with flexible engaging members 36 which are adapted to engage in an associated socket member 37 carried by the associated strap 35 (see Figure 8).

In operation the members 36 are snapped into the socket member 37 so that they engage in apertures 38 in the socket member 37. In order to do this the two members 36 are squeezed together so that they can be inserted into the tubular socket member 37.

In order to release the two straps 34, 35 from one another the members 36 are squeezed together to disengage them from the apertures 38 and thus enable the ends of the two straps 34, 35 to be separated.

A spigot 40 engages in a channel formed in the socket 37 to act as a guide.

The straps 34 are provided with a conventional means for adjusting their lengths generally indicated by the reference numeral 39.

With this seat arrangement it is thus possible to accommodate different widths and lengths of the frame A.

The seat portion 32 is of sufficient depth to accommodate the maximum adjusted length of the frame A. In order to adapt to the minimum length of the frame A, or lengths between the maximum and the minimum, the material of the seat is folded back on itself to a lesser or greater degree as illustrated in Figure 7. It is kept in such a folded back configuration by any suitable means such as a strip or strips of "Velcro" (Registered Trade Mark), the frame A is illustrated as having a foot rest member 41. However, in the event that the wheel chair was to be used for sporting purposes it would also be provided with a further tubular member 42 extending forwardly of the most forward part of the frame A in order to act as a kind of bumper in order to protect the feet of the wheel chairs occupant, during, for example, a game of basketball.

The wheel chair of the present invention thus enables different sizes of occupant to be accommodated. It is therefore particularly suitable for use by children as the frame A can be set to its smallest size when the child is small and can then be progressively expanded both width wise and length wise to accommodate the growth of the child.

Although the invention has been illustrated in terms of a wheel chair which would be suitable for sporting activities the principal of construction of the frame A could clearly be applied to any type and detailed design of wheel chair.

CLAIMS

1. A wheel chair comprises the following combination of features:

a) a frame made up of a plurality of transverse and longitudinal members; and

b) sufficient of said members are constructed so that their length can be varied whereby both the width and the length of the frame may be adjusted.

2. A wheel chair as claimed in claim 1 in which each frame member consists of at least two tubular members which are slidable one within the other to enable the overall length of that member to be increased or decreased, the two tubular members being lockable with respect to one another in the selected position.

3. A wheel chair as claimed in either claim 1 or 2 in which the frame assembly supports a seat assembly, the latter comprising a flexible seat portion and a flexible back portion each of which portions is secured to the frame member by means of an adjustable strap arrangement to enable the seat assembly to

accommodate different widths and or depths of the frame assembly.

4. A wheel chair as claimed in any previous claim in which at least some of the wheels are dismountable from the frame assembly and are adjustable in relation to the frame assembly to enable the height and/or inclination of the seat assembly with respect to the ground to be alterred.

5. A wheel chair as claimed in any previous claim in which the frame members are made of steel or aluminium alloy.

6. A wheel chair substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

FIG.1.

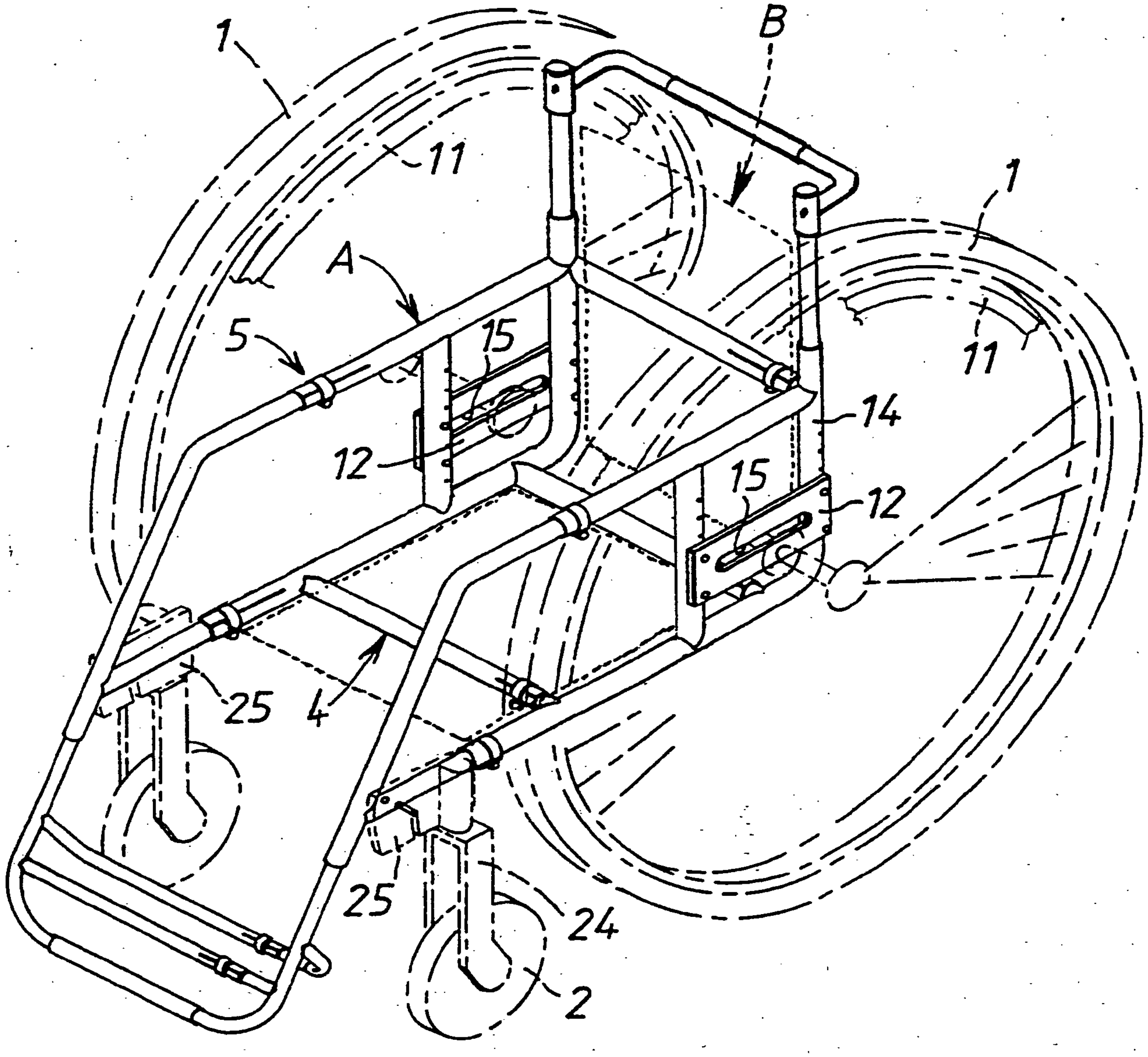


FIG.2.

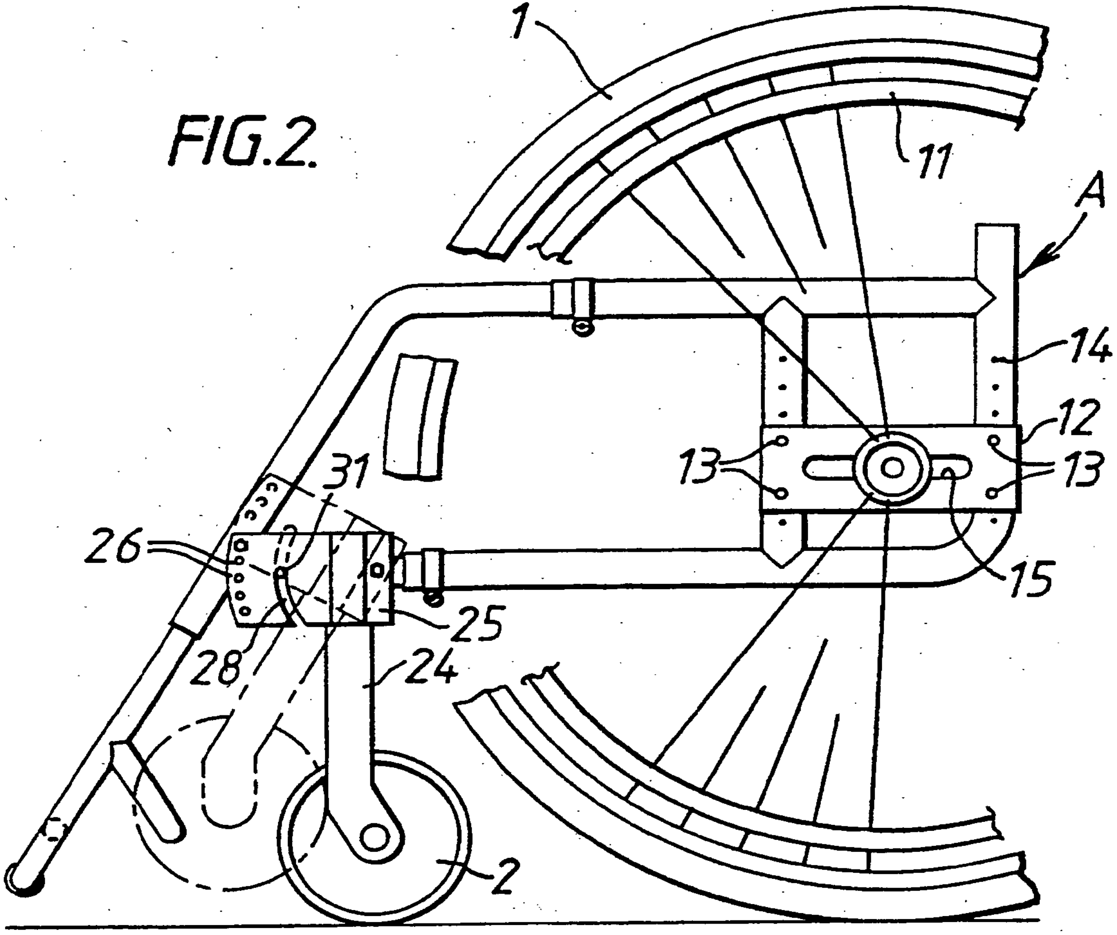


FIG. 4.

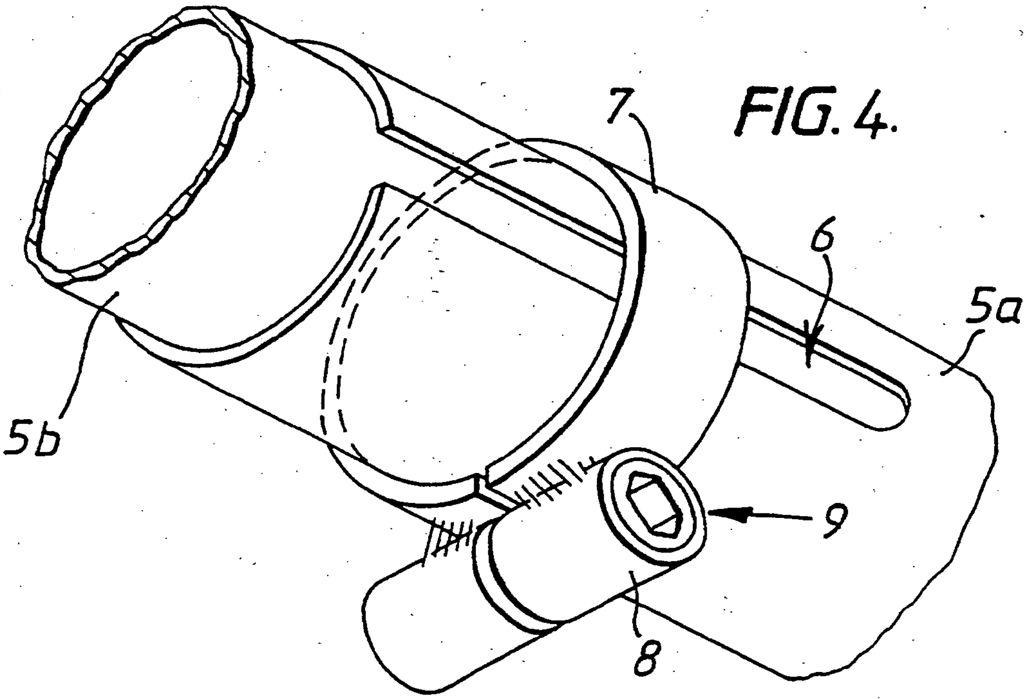


FIG. 3.

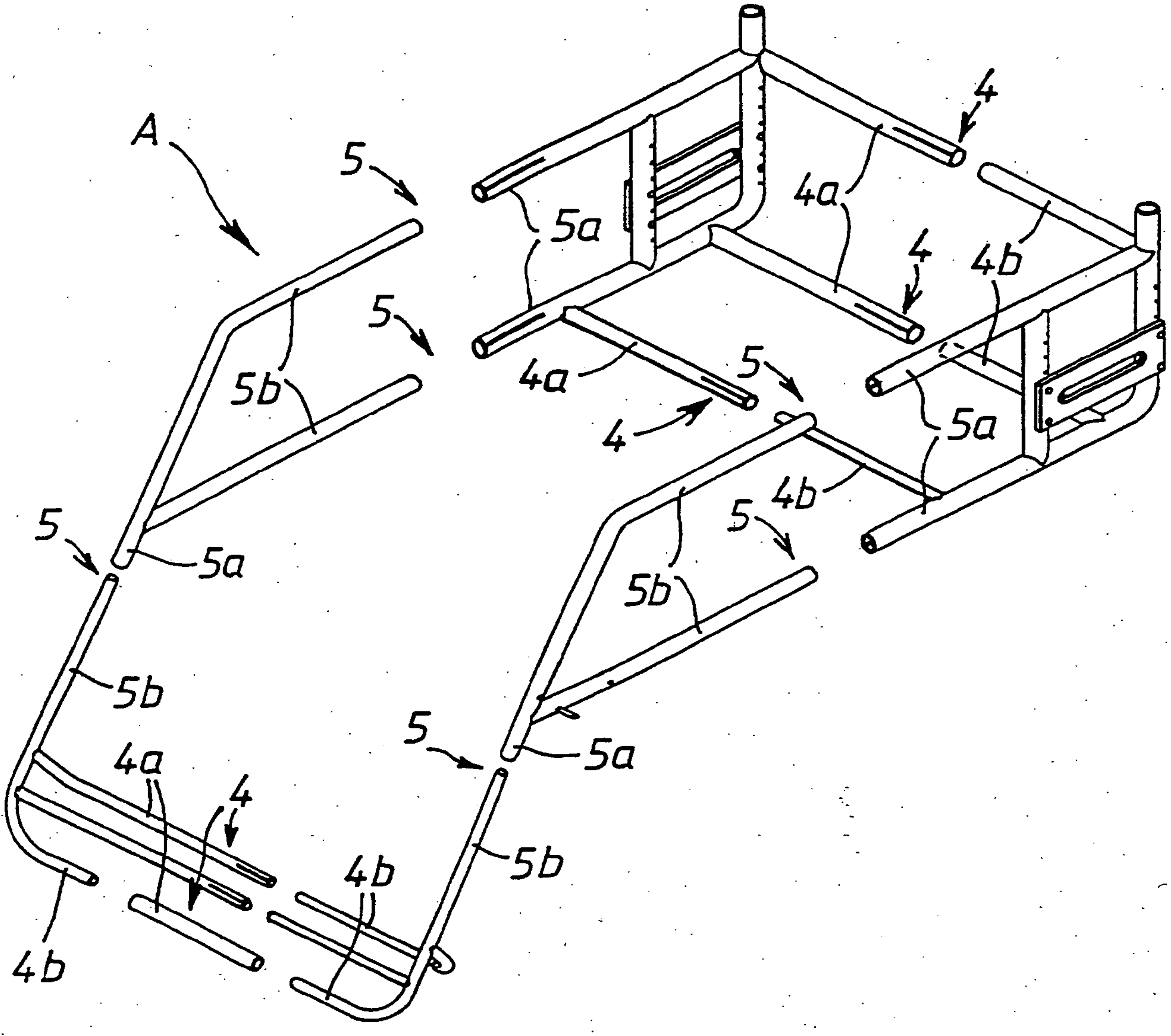


FIG.5.

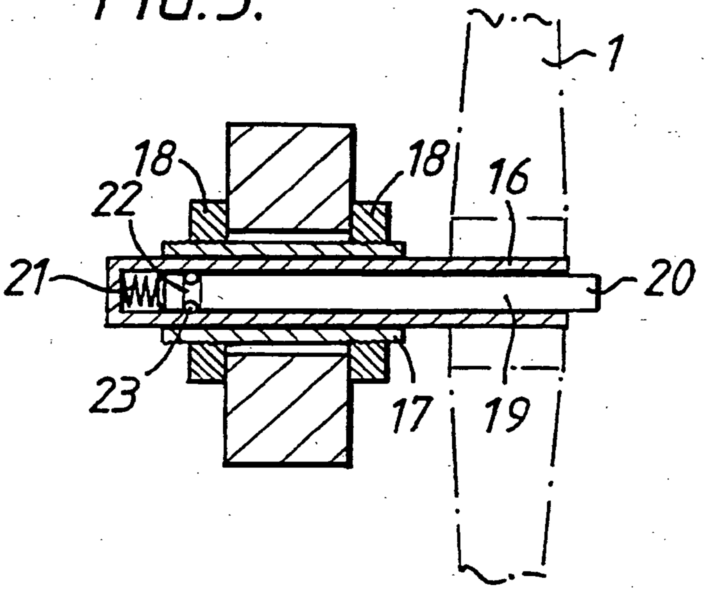
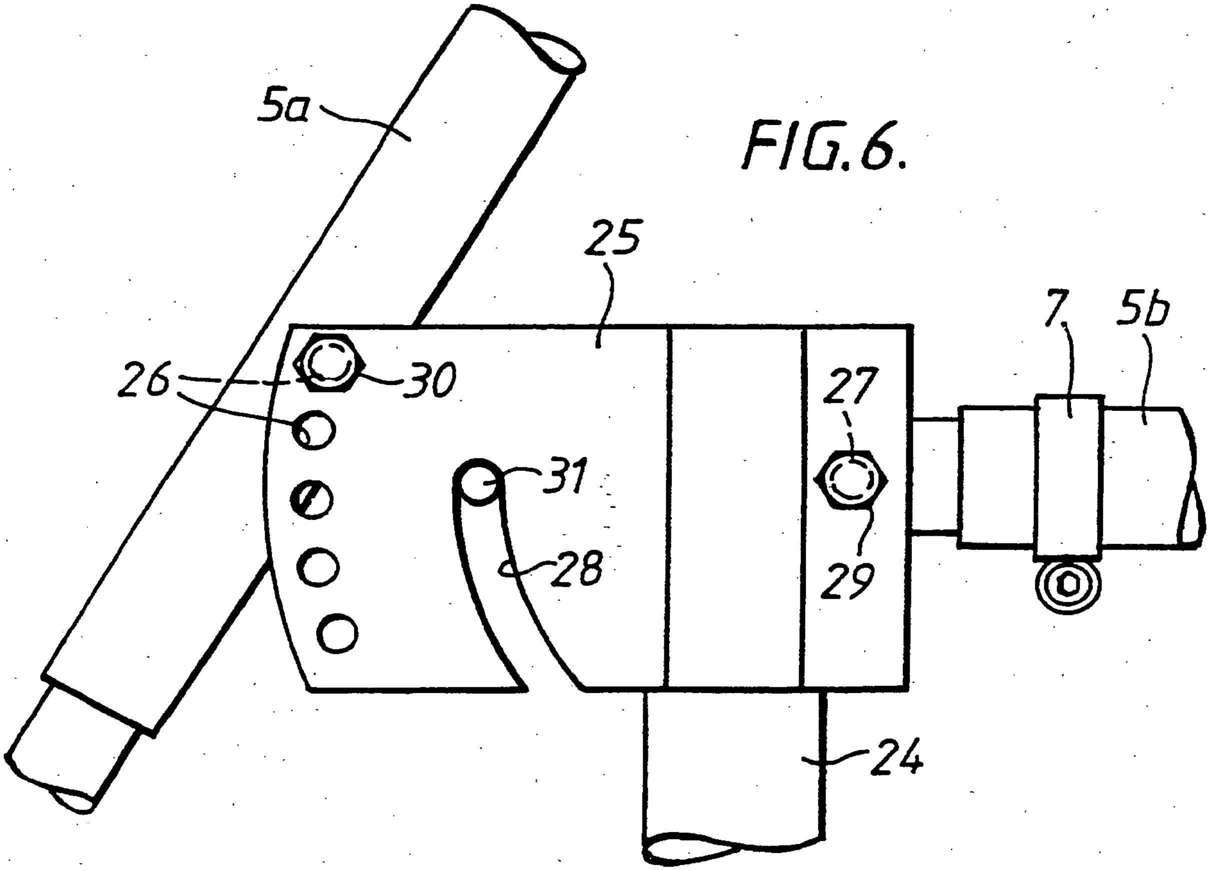


FIG.6.



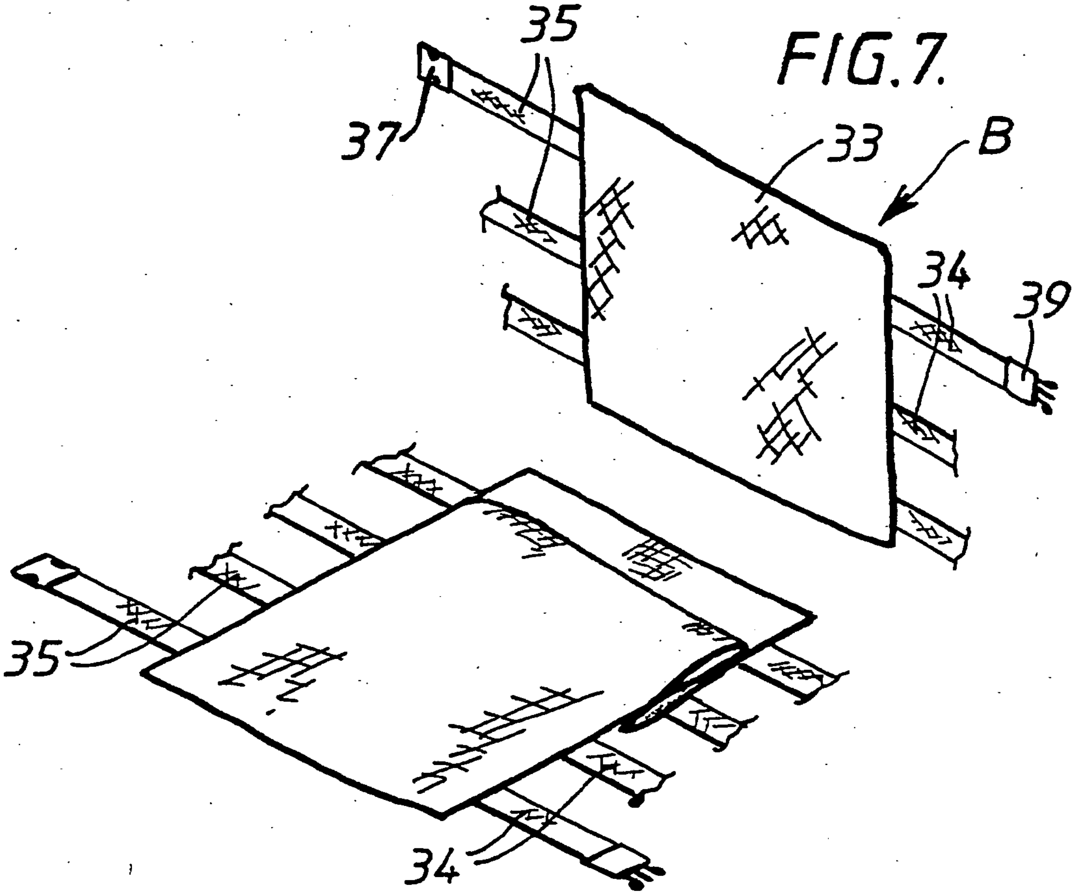


FIG.7.

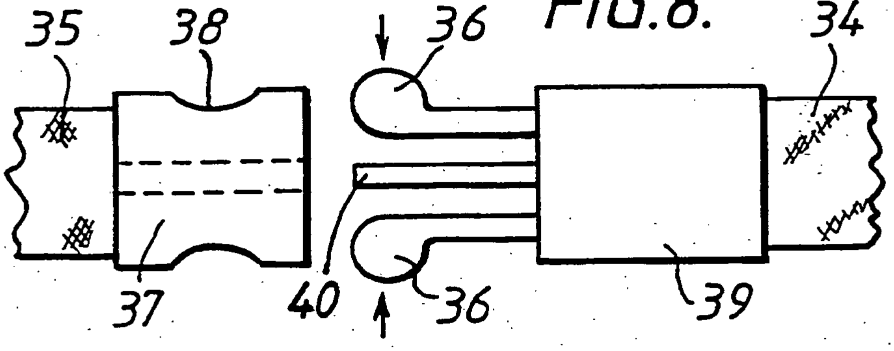


FIG.8.

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 90/01732

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC^5: A 61 G 5/00

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC^5	A 61 G, A 47 C

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document, [11] with Indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, A, 4813693 (LOCKHARD) 21 March 1989 see the whole document --	1,2,4,6
X	US, A, 2769483 (PETERSON) 6 November 1956 see column 1, lines 39-49; column 2, lines 22-40; column 3, lines 4-11, 34-41, 49-60; figures --	1,2,5,6
X	US, A, 3971592 (FARLEY) 27 July 1976 see the whole document --	1,2,3,6
A	US, A, 4360213 (RUDWICK) 23 November 1982 see column 8, lines 39-56; figure 15 -- ./.	3

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IV. CERTIFICATION

Date of the Actual Completion of the International Search 15th February 1991	Date of Mailing of this International Search Report - 8. 03. 91
International Searching Authority EUROPEAN PATENT OFFICE	Signature of Authorized Officer M. PEIS M. Peis

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, 11 with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	US, A, 4730842 (SUMMERS) 15 March 1988 see abstract; figures --	1
A	US, A, 4082348 (MAURY) 4 April 1978 see abstract; figures --	1
A	US, A, 4351540 (MINNEBRAKER) 28 September 1982 see abstract; figures --------	1

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. GB 9001732

SA 41878

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4813693	21-03-89	US-A- 4840390 US-A- 4981305	20-06-89 01-01-91
US-A- 2769483		None	
US-A- 3971592	27-07-76	None	
US-A- 4360213	23-11-82	None	
US-A- 4730842	15-03-88	None	
US-A- 4082348	04-04-78	None	
US-A- 4351540	28-09-82	US-A- 4477098 US-A- 4428594 US-A- 4515383 US-E- RE32242	16-10-84 31-01-84 07-05-85 09-09-86

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